

Research Article**A Study to Assess the Effectiveness of Multi-Sensory Stimulation Technique on the Neurological Status of Cerebrovascular Accident (CVA) Patients at Selected Hospital of Kanpur, Uttar Pradesh****Laxmi Yadav¹, K. Jyothisree²**¹M.Sc. Nursing 2nd Year, Rama College of Nursing, Rama University, Kanpur, Uttar Pradesh.²Associate Professor Cum HOD, Medical Surgical Nursing, Rama University, Kanpur, UP.**Corresponding Author:** K. Jyothisree, Associate Professor Cum HOD,
Medical Surgical Nursing, Rama University, Rama University, Kanpur, UP.**E-mail:** k.jyothisree.rcn@ramauniversity.ac.in**Abstract**

Cerebrovascular accident (CVA) is a major neurological condition contributing significantly to global mortality and long-term disability. Early nursing interventions are vital for recovery, with multisensory stimulation emerging as a promising non-invasive approach. A quantitative evaluative approach using a quasi-experimental pre-test and post-test design was employed. A total sample of 60 patients (30 experimental, 30 control) was selected through non-probability purposive sampling. While the control group received routine care, the experimental group received structured multisensory stimulation. Post-test results demonstrated a significant improvement in the experimental group: 66.67% achieved normal status, whereas 50% of the control group remained in the moderate category. The experimental group's mean neurological score rose from 38.40 to 60.23, whereas the control group only moved from 38.40 to 38.60. Paired t-test ($t = 9.53$, $p = 0.05$) confirmed intervention efficacy at the $p < 0.05$ level. Significant associations were found between pre-test neurological status and educational status ($p = 0.005$), occupational status ($p = 0.0002$), hospital stay duration ($p = 0.035$), and current treatment ($p = 0.130$).

Multisensory stimulation is an effective, safe, and non-invasive nursing intervention.

Keywords: Multisensory Stimulation Technique, Neurological Status, Cerebrovascular Accident, Stroke Recovery.

Introduction

A stroke, or cerebrovascular accident (CVA), occurs when blood flow to a region of the brain is interrupted due to arterial blockage (ischemic stroke) or vascular rupture (haemorrhagic stroke), leading to tissue damage, cell death, and rapid loss of brain function. The incidence of stroke is on the rise, largely due to the increasing population of individuals aged over 65, which is projected to grow from 390 million currently to 800 million by 2025.¹

Cerebrovascular disorders encompass a broad category that includes any functional irregularity for the centralized neurological network (CNS) caused by an abnormality within the nervous system's usual supply of blood.²

An MSS intervention refers to a method that engages two or more human senses through visual, tactile, auditory, or olfactory stimuli. Although the use of multisensory interventions is on the rise, they are frequently implemented in an ad hoc fashion without established guidelines, and there is a scarcity of empirical evidence regarding their effectiveness.³

Need for the study

The increasing prevalence of stroke in developing countries has become a major concern in recent decades. The increasing number of cases of vascular disease is being associated with a variety of factors, including rapid urbanization, changing lifestyles, poor dietary habits, inactivity levels, and an upward trend in a number of risk variables like cigarette smoking, diabetic mellitus, excess weight, and high blood pressure.⁴ Consequently, a substantial amount of the globe stroke-related load progressively lies upon low-income countries.⁵

It is estimated that nearly two million individuals survive stroke but require assistance in performing activities of daily living such as walking, dressing, eating, and maintaining personal hygiene. Dependence on others for daily activities can significantly reduce a person's independence, self-esteem, and overall quality of life. In addition, the long-term care required for stroke survivors often creates emotional stress, financial strain, and caregiving challenges for family members.⁶

This research seeks to analyse the influence of multimodal stimulation interventions (MSS) on people in typical nursing homes with major neuropsychological.

Statement of The Problem

A quasi-experimental study to evaluate the effectiveness of multi-sensory stimulation technique on the neurological status of cerebrovascular accident (CVA) patients at selected hospital of Kanpur, Uttar Pradesh.

Objectives of The Study

1. To assess the existing neurological status of the CVA patients.
2. To evaluate the effectiveness of multi-sensory stimulation technique to improve neurological status of CVA patients.
3. To assess pretest score of neurological status of CVA patients with selected demographic variables.

HYPOTHESIS

Null Hypothesis:

H01- There is no significant difference in the improvement of the neurological status of CVA patients after multi- sensory stimulation technique.

H02- There is no significant association between multi- sensory stimulation technique and neurological status of CVA patients with demographic variables.

Positive Hypothesis:

H1- This is significant improvement in the neurological status of the CVA patients after multi sensory stimulation technique.

H2- There is significant association between neurological status and multi-sensory stimulation technique of the CVA patients with demographic variables.

METHODS AND MATERIALS

Research Approach

Quantitative evaluative research approach was utilized in the present study.

Research Design

Quasi-experimental non-equivalent control group pre-test and post-test design was utilized.

VARIABLES

Independent Variable: Multi-sensory stimulation technique.

Dependent Variable: Neurological status of CVA patients.

Demographic Variables: Age, gender, educational status, occupation, income, marital status, hospital stay duration, stroke type, comorbidity, and current medications.

Target Population

Hospitalized CVA patients admitted in the neurology ward and ICU of selected hospital in Kanpur.

Sample & Sample Size

A sample of 60 CVA patients meeting inclusion criteria was selected and allocated into two groups:

Experimental Group (n = 30): Received standard care along with structured multi-sensory stimulation.

Control Group (n = 30): Received routine medical and nursing care only.

Sampling Technique

Non-probability purposive sampling technique.

SAMPLING CRITERIA

Inclusion Criteria:

Patients diagnosed with CVA aged 30–70 years.

Conscious or semi-conscious patients with Glasgow Coma Scale (GCS) score of 9–12.

Willingness to participate in the study.

Exclusion Criteria:

Completely unconscious or mechanically ventilated patients.

Patients with severe pre-existing cognitive, visual, or auditory deficits.

Table no. 1: Classification of Neurological Status Score

The total score ranges from 1-80 indicating the level of neurological functioning.

SCORE RANGE	INTERPRETATION
61-80	Normal
41-60	Mild
21-40	Moderate
<20	Severe

Result and Findings

SECTION A

Experimental Group

- Educational status ($p = 0.005$), occupational status ($p = 0.0002$), and duration of hospital stay ($p = 0.035$) showed a significant association with pre-test neurological status.
- Age, gender, marital status, monthly income, type of stroke, co-morbidity, and current treatment showed no significant association ($p > 0.05$).

Control Group

- Educational status ($p = 0.006$) showed a significant association with pre-test neurological status, indicating that the level of education influenced neurological status.
- Age, gender, occupational status, marital status, monthly income, days of hospital stay, type of stroke, co-morbidity, and current treatment showed no significant association.

SECTION B

Comparison of Pre and Post-test neurological status between Experimental and Control Groups using dependent t-test

Neurological examination	N	(n=60)				't' Value	'p' Value
		Mean	SD	Pretest	Post-test		
		Pre-post	Post-test	Pretest	Post-test		
Control group	30	38.40	38.60	18.19	17.88	0.18	0.85
							(NS)
Experimental group	30	38.40	60.23	18.19	16.19	9.53	0.05
							(S)

The results show that multisensory stimulation is effective in increasing neurological status of CVA patients.

*Statistically significant at $p < 0.05$ level

Mean, Standard deviation, 't' value and 'p' value of Experimental and Control Groups using independent t-test

(n=60)					
GROUP	MEAN	SD	UNPAIRED 'T' TEST VALUE	TAB VALUE <0.05	INFERENCES
Experimental group (n=30) Post test	60.23	16.19	4.78	0.05	Significant
Control group (n=30) Post test	38.60	17.88			

The above table represents the mean, standard deviation, and unpaired t-test value of post-test scores among the participants in the experimental and control groups. It reveals that in the experimental group, the mean value is 60.23 with a standard deviation of 16.19. In the control group, the mean value is 38.60 with a standard deviation of 17.88.

The unpaired t-test value is found to be 4.78, which is highly significant at the 0.05 level. This indicates a statistically significant difference in the post-test levels between the experimental and control groups.

Hence, the research hypothesis H_1 is accepted. H_{01} is rejected.

Discussion

The experimental group demonstrated a 21.83-point mean score improvement after receiving structured multisensory stimulation for 7 days, with 66.67% transitioning into the normal category. In contrast, the control group exhibited negligible change (0.20-point gain). These findings support neuroplasticity principles where multi-modal inputs stimulate reticulo-cortical pathways and promote early motor and sensory arousal.

NURSING IMPLICATIONS

Nursing Practice

Bedside nurses can easily perform bedside multisensory stimulation protocols to prevent sensory deprivation and promote rapid recovery in acute CVA settings.

Nursing Education

Sensory stimulation and early coma arousal protocols should be integrated into medical-surgical nursing and critical care curricula.

Nursing Administration

Nurse administrators should implement standardized MSS toolkits and protocol guidelines in ICUs and stroke units to maintain high standards of patient care.

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